

iMux

RLH iMux System

MODULAR 16x1 VOICE AND DATA MULTIPLEXED OVER FIBER OPTICS

The iMux is a powerful fiber optic modular multiplexer capable of providing up to 16 channels of E1, T1, V.35 (RS530), X.21, RS232, 2/4 wire analog data/SCADA/E&M and analog phone FXO/FXS services, plus four built-in 10/100M Ethernet ports, over a single fiber.

These services are supplied by iMux 4x1 modules that plug into the back of the unit. Each module has 4 ports, and up to 4 modules may be installed in any combination. Spares or add-on modules may be ordered separately and installed by the end user, and may be used with leased lines to build up private networks, private telephone networks (by interconnecting PBX's) or access the internet or a partner network (extranet). A typical complete system comprises of one FXO and one FXS module, or use an FXS unit at each end for ringdown operation where direct connection to phones on both ends of the system is desired.

The optical modules are installed into the front of the unit. Both dual fiber and single bi-directional fiber (WDM) optical modules are available, and up to 2 optical modules may be installed, providing 1+1 hot-swappable optical protection and making the best use of fiber availability.

The iMux may be managed through SNMP, web Interface, VT100 craft port or LCD/menu keys on the front panel. It also has an external alarm port for alarm input monitor purposes, and an alarm port with four alarm contacts. The system provides local/remote loopback functions for optical and E1 interfaces, and is ideal for network testing and maintenance.

The iMux takes up 1RU and comes complete with EIA19" and 23" rack ears, or it may be used on a desktop or shelf.



RLH iMux with dual optics modules

Standard Features

Multiplexes up to 16 voice and data channels plus Ethernet over a single fiber

Up to 4 modules (each with 4 ports) may be used in any combination to mix and match services

Convenient front LED status indicators

E1, T1, V.35, RS530, X.21, RS232, FXO/FXS, 2/4 wire Analog Data/SCADA/E&M & 10/100Base-T Ethernet port options

Aggregated Ethernet throughput up to 100Mbps

Supports VLAN/QOS and port rate control

Optical module auto laser shutdown (ALS), hot swappable 1+1 protection

Alarm relay has major and minor alarms (audible and visible alarm output)

Supports SNMP, HTTP / FTP / TFTP remote software upgradeable

Supports TELNET function to configure and monitor local and remote devices through TCP/IP network

Provides the parity error count for optical interface performance monitoring

Includes optical line local loopback and remote loopback functions

An Embedded Operation Channel (EOC) is maintained between local and remote sides for system configuration, testing, performance and alarm monitoring of each E1 channel and optical link

External clock (Optional): E1 external TTL clock or PCM data Input through DB-9 connector

Class I Laser optical module is safety standard IEC 825 compliant

Available with ringdown circuit operation

Redundant 48VDC or AC/DC powering options



iMux back panel showing power, alarm, and 4 modules (16 ports total) installed. T1 and analog POTS modules are shown.

Module Specifications

T1 Interface Module	
Channel capacity	(4)T1
Bit Rate	1.544Mbps \pm 32ppm
Line Code	B8ZS/AMI
Frame Format	SF, ESF, Unframed
Impedance	100 Ω balanced
Electrical Interface	Compliant with ITU-T G.703
Jitter Tolerance	Compliant with ITU-T G.824
Jitter Transfer	Compliant with ITU-T G.743
Connector	RJ-45

E1 Interface Module	
Channel capacity	(4) E1
Bit Rate	2.048Mbps \pm 50ppm
Compliance standard	ITU G.703
Line Code	HDB3 / AMI
Frame Format	SF, ESF, Unframed
Impedance	75 Ω unbalanced or 120 Ω balanced
Electrical Interface	Compliant with ITU-T G.703
Jitter Tolerance	Compliant with ITU-T G.823
Jitter Transfer	Compliant with ITU-T G.742
Connector	RJ-45

RS232 Interface Module	
Channel capacity	(4) RS232
Bit Rate	Up to 115200 bps TXD/RXD 1.536Mbit/s DTR/DSR 128Kbit/s RTS/CTS 128Kbit/s DCD/RI 64Kbit/s
Supported Loopback	Local and Remote

V.35 Interface Module	
Channel capacity	(4) V.35, RS-530, X.21
Data Rate	n*64K, n=1~32 (64~2048kb/s)
Clock Mode	Internal, External, DTE, Recovery
Control Signal	CTS follows RTS, DSR always ON except at test loop mode, DCD always ON except at fiber loss of signal condition
Loop-back	Local loop back, remote loop back, V.54
Connectors Available	HD-68 (SCSI-III) Female with optional cables: HD-68 to 4*V35(M34 female) cable HD-68 to 4*X.21(DB15 female) cable

Module Specifications

2/4 Wire Analog Data/Audio/SCADA Module

Channel capacity	(4) Analog 2/4 wire data/Audio/SCADA
Connector	RJ-11 x 4
Bandwidth	300Hz ~ 3.4KHz
Impedance	600Ohm
Longitudinal Conversion Loss	>60dB
Return Loss	>30dB
Idle Channel noise	75dB
CMRR	>60dB

2/4 Wire Analog Data/Audio/SCADA/E&M Module

Channel capacity	(4) Analog 2/4 wire data/Audio/SCADA/E&M
Connector	RJ-45 x 4
Bandwidth	300Hz ~ 3.4KHz
Impedance	600Ohm
Longitudinal Conversion Loss	>60dB
Return Loss	>30dB
Idle Channel noise	75dB
CMRR	>60dB

Analog Phone (POTS) Interface Module

FXO Module	(4) RJ-11 phone interface
FXS Module	(4) RJ-11 phone interface
Phone functions	Supports caller I.D. and call forwarding

Optical Interface Module

Wavelength	1310/1550 ± 50nm
System Gain	19 ~ 30dB
Fiber connectors	SC, ST or FC
Maximum Fiber Distance	Multimode: 1.25 miles (2 km) Single-mode: 18 miles/30km; 43 miles/70km; 74 miles/120km
Optional: Bi-directional (WDM) Fiber Optic Module	



iMux user installable module. Analog POTS module shown.

General Specifications

General Specifications	
Alarm Contacts	4 relay contacts (DB-9 connector)
External Alarm	DB-9 connector
Compliance standard	ITU G.703
10/100 Ethernet	IEEE 802.3/802.3u
Modes	10/100M, full/half-duplex, auto-negotiation and auto MDI/MDIX
Frame buffer	329 frames, IEEE 802.3X standard
MAC Table	1024-entry MAC address mapping
Supported functions	VLAN/QOS and Port Rate Control
Connector	(4) RJ-45 ports
Power Requirements	90 ~ 240 VAC (47Hz ~ 63Hz) and 48VDC (36 ~ 75 V)
	Dual 48VDC (36 ~ 75 V)
Power Consumption	20W max, (w/ all ports used)
Operating Temperature	0°C ~ +50°C (32°F ~ 122°F)
Dimensions	W17.3in x D11.2in x H1.75in (440mm x 285mm x 44.5mm)
Included	19"/23" rack ears, serial cable, installation guide, power cord, module and port pre-configuration.

Ordering Information

Base Systems

Part Number	Description	Power 1	Power 2	Dimensions (1RU)
RLH-IMUX-V-2	iMUX BASE SYSTEM DUAL 48VDC INPUT PWR	48VDC	48VDC	W17.3in x D11.2in x H1.75in (440mm x 285mm x 44.5mm)
RLH-IMUX-A-2	iMUX BASE SYSTEM AC/DC & 48VDC INPUT PWR	115/220VAC	48VDC	W17.3in x D11.2in x H1.75in (440mm x 285mm x 44.5mm)

- ▶ Optics and Service Modules are ordered separately and are pre-installed.
- ▶ System is pre-configured before shipping for quick and easy operation.
- ▶ 2 multiplexers are required for a complete system.
- ▶ Bidirectional single fiber models require an A side unit and a B side unit for a complete system.
- ▶ Please contact your RLH sales representative for pricing and delivery information.

iMux Service Port Modules

Part Number	Description
RLH-MM-TI	T-1 4X1 MODULE
RLH-MM-EI	E-1 4X1 MODULE
RLH-MM-DI	R-232 4X1 MODULE
RLH-MM-V3	V.35 (RS-530) 4X1 MODULE
RLH-MM-AO	2 WIRE (POTS) FXO/CO 4X1 MODULE
RLH-MM-AS	2 WIRE (POTS) FXS/SUB 4X1 MODULE
RLH-MM-D2	2/4 WIRE ANALOG DATA/AUDIO/SCADA 4X1 MODULE
RLH-MM-EM	2/4 WIRE ANALOG DATA/AUDIO/SCADA/E&M 4X1 MODULE

- ▶ Service Modules are ordered at same time as base system and are pre-installed.
- ▶ System is pre-configured before shipping for quick and easy operation.
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iMux Optics

Part Number	Description	Side	Distance	Fiber	Part Number
Bi-Directional Multimode SC	iMux Optical Module	A	2 km/1.2 mi	62.5 μm	RLH-OM-01-I
	iMux Optical Module	B	2 km/1.2 mi	62.5 μm	RLH-OM-02-I
Multimode SC	iMux Optical Module	-	2 km/1.2 mi	62.5 μm	RLH-OM-03-I
Multimode ST	iMux Optical Module	-	2 km/1.2 mi	62.5 μm	RLH-OM-04-I
Bi-Directional Single-mode SC	iMux Optical Module	A	20km/12.4mi.	8~9 μm	RLH-OM-10-I
	iMux Optical Module	B	20km/12.4mi.	8~9 μm	RLH-OM-11-I
	iMux Optical Module	A	40km / 24.9mi.	8~9 μm	RLH-OM-12-I
	iMux Optical Module	B	40km / 24.9mi.	8~9 μm	RLH-OM-13-I
	iMux Optical Module	A	60km / 37mi.	8~9 μm	RLH-OM-14-I
	iMux Optical Module	B	60km / 37mi.	8~9 μm	RLH-OM-15-I
Single-mode SC	iMux Optical Module	-	20km/12.4mi.	8~9 μm	RLH-OM-40-I
	iMux Optical Module	-	60km / 37mi.	8~9 μm	RLH-OM-41-I
	iMux Optical Module	-	120km / 74 mi.	8~9 μm	RLH-OM-42-I
Single-mode ST	iMux Optical Module	-	20km/12.4mi.	8~9 μm	RLH-OM-50-I
	iMux Optical Module	-	60km / 37mi.	8~9 μm	RLH-OM-51-I
	iMux Optical Module	-	120km / 74 mi.	8~9 μm	RLH-OM-52-I

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Warranty

RLH is recognized throughout the U.S. in the telecommunications industry for our experience and we stand with total confidence in our quality. This product is warranted to be free of defects in material and workmanship.

RLH Industries, Inc. will repair or replace these products that fail provided the defective part is returned to RLH freight prepaid.

To make a warranty claim, or schedule repair or replacement of your RLH product, please contact us for an RMA number. You will be promptly assisted by one of our warranty specialists. All returns must have an RMA number before we can receive any items.

Technical Support

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Contact Information

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Specifications subject to change without notice.